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- (71) Applicant and  
(72) Inventor: LAWSON, William [US/US]; 115 Oak Lane,  
Ormond Beach, FL 32174 (US).
- (74) Agent: HOBBY, William, M., III; Suite 375, 157 E. New  
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TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

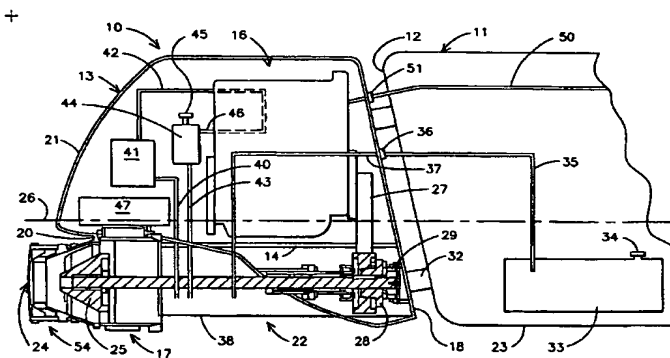
(84) Designated States (regional): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian  
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European  
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,  
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For two-letter codes and other abbreviations, refer to the "Guidance  
Notes on Codes and Abbreviations" appearing at the beginning  
of each regular issue of the PCT Gazette.

(54) Title: OUTBOARD JET DRIVE BOAT



(57) Abstract: An outboard jet drive boat apparatus has a boat hull (11) having a transom (12) and having a removably attached outboard jet drive (10) attached to the transom (12). The outboard jet drive (10) includes a housing (13) sealed against the intrusion of water and has an engine mounting platform (14) therein having an engine (16) mounted thereon on flexible engine mounts (15). The housing (13) has a sealable entrance through the top thereof and is removably attached to the transom of the hull (11). A jet drive unit (17) is attached in the housing (13) below the engine supporting platform (14) and extending generally parallel to the engine (16) and extending from the front of the housing (13) out the rear of the housing. The jet drive unit (17) is operatively attached to the overhead engine (16) through a clutch mechanism. A main fuel tank (33) is positioned inside the hull (11) and is connected to a fuel line (35) to an auxiliary fuel tank (38) inside the housing (13) and the auxiliary fuel tank (38) is connected to the engine (16) for feeding fuel to the engine (16). The fuel pump (41) is mounted in the housing (13) to pump fuel to the engine (16) from the auxiliary fuel tank (38) and from the main fuel tank (33) to the auxiliary fuel tank (38). Electrical controls are located in the hull couple through the housing (13) to the engine controls and controls the engine (16) and jet drive unit (17).

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## OUTBOARD JET DRIVE BOAT

1 BACKGROUND OF THE INVENTION

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3       The present invention relates to an outboard jet  
4 drive boat and especially to an outboard jet drive  
5 having an engine and jet drive mounted in a housing  
6 which is removably attached to the transom of a boat  
7 hull.

8       There have been several proposed types of  
9 outboard jet drives for watercraft but most are  
10 similar to an outboard motor in which the outboard  
11 motor propeller and lower unit have been replaced with  
12 a jet drive. The jet drive includes a jet pump in the  
13 lower unit that operates so as to provide propulsion  
14 force for a watercraft. There are advantages in  
15 employing jet pumps for propulsion units as opposed to  
16 propellers. The jet drive permits operation in  
17 shallower water and also the propeller is shrouded and  
18 there is less likelihood of injury. There has been a  
19 variety of proposed constructions for outboard jet  
20 drives for positioning the jet pump in different  
21 positions relative to the hull transom and bottom of  
22 the transom but in a typical jet drive, the engine and  
23 jet drive are located directly in the hull with an  
24 opening in the bottom of the hull for capturing water  
25 passing under the hull and then utilizing the jet  
26 pumps to thrust the water out the rear of the hull to  
27 propel the boat. Outboard jet drive units are made  
28 similar to typical outboard motors with a motor  
29 driving a drive unit which operates a jet drive unit.

30       Prior art outboard liquid jet propulsion units  
31 can be seen in the Nanami U.S. patent, No. 5,536,187,  
32 for an outboard jet drive for watercraft in which the

1 jet propulsion unit is disposed forwardly of the  
2 transom and beneath the undersurface of the hull for  
3 improving its pumping efficiency while the motor is  
4 attached to the transom of the boat. In the Jordan  
5 U.S. patent, No. 4,459,117, a liquid jet propulsion  
6 unit is driven by a conventional outboard motor. The  
7 drive of the motor directly rotates an impeller which  
8 draws water into the impeller chamber and through an  
9 outlet chamber and nozzle to drive the craft forward.  
10 In the Miyamoto U.S. patent, No. 4,457,724, an  
11 apparatus for driving a surfboard includes an internal  
12 combustion engine mounted in a box which is mounted on  
13 the rear portion of the surfboard. A water jet  
14 propelling device is driven by the internal combustion  
15 engine for propelling the surfboard. The exhaust gas  
16 system in the water jet propelling device is  
17 positioned in the box. In the U.S. patent to Boyer et  
18 al., No. 4,942,838, an inflatable watercraft has a  
19 portable engine package. The engine package includes  
20 an internal combustion engine mounted in a thin  
21 fiberglass hull. The base plate of the hull includes  
22 a water inlet scoop for feeding water to the pump and  
23 an exhaust port for exhausting the water. The pumps  
24 high pressure water outlet is pointed in the aft  
25 direction above the water line to propel the craft by  
26 the reaction force resulting from the high velocity  
27 water jet. In the F.C. Clark U.S. patent, No.  
28 3,055,175, a marine propulsion unit takes a  
29 conventional outboard motor and replaces the prop unit  
30 with a marine jet motor using a pump to issue a jet of  
31 water to propel a boat. The Parker U.S. patent, No.  
32 5,356,319, is for a boat with a removably inboard jet  
33 propulsion unit in which the integral jet power unit  
34 is encased in a waterproof housing and positioned in

1 a well located in the hull and is mounted to be  
2 removed from the hull.

3 The present invention is directed towards an  
4 outboard jet boat in which the main fuel tank and  
5 controls are mounted within the hull of a boat while  
6 the outboard jet drive unit is mounted in a housing  
7 with an engine and is removably attached to the  
8 transom of the boat. The fuel tank and controls are  
9 connected between the hull and outboard drive through  
10 quick disconnect couplings. The housing is shaped to  
11 support an engine on a platform directly over the jet  
12 drive unit for actuating the jet drive unit through a  
13 clutch mechanism with the engine and jet drive  
14 positioned parallel to each other.

15

16 SUMMARY OF THE INVENTION

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18 An outboard jet drive boat apparatus has a boat  
19 hull having a transom and having a removably attached  
20 outboard jet drive attached to the transom. The  
21 outboard jet drive includes a housing sealed against  
22 the intrusion of water and has an engine mounting  
23 platform therein having an engine mounted thereon on  
24 flexible engine mounts. The housing has a sealable  
25 entrance through the top thereof and is removably  
26 attached to the transom of the hull. A jet drive unit  
27 is attached in the housing below the engine supporting  
28 platform and extends generally parallel to the engine  
29 from the front of the housing and through the rear of  
30 the housing. The jet drive unit is operatively  
31 attached to the overhead engine through a clutch  
32 mechanism. A main fuel tank is positioned inside the  
33 hull and is connected with a fuel line to an auxiliary  
34 fuel tank inside the housing and the auxiliary fuel

1 tank is connected to the engine for feeding fuel to  
2 the engine. The fuel pump is mounted in the housing  
3 to pump fuel to the engine from the auxiliary fuel  
4 tank and from the main fuel tank to the auxiliary fuel  
5 tank. Electrical controls are located in the hull and  
6 coupled through the housing to the engine to control  
7 the engine and jet drive unit. Quick disconnect  
8 couplings allow the fuel line and control lines to be  
9 rapidly connected and disconnected to the outboard  
10 drive unit.

11

12 BRIEF DESCRIPTION OF THE DRAWINGS

13

14 Other objects, features, and advantages of the  
15 present invention will be apparent from the written  
16 description and the drawings in which:

17 Figure 1 is a sectional view taken through an  
18 outboard jet drive boat in accordance with the present  
19 invention;

20 Figure 2 is a sectional view of an outboard jet  
21 drive housing having a jet drive unit mounted therein;

22 Figure 3 is a rear elevation of the jet drive  
23 unit of Figure 2; and

24 Figure 4 is a block diagram of the connected fuel  
25 tanks.

26

27 DESCRIPTION OF THE PREFERRED EMBODIMENT

28

29 Referring to Figures 1-3, an outboard jet drive  
30 unit 10 is shown attached to the hull of a boat 11 on  
31 the transom 12. The outdrive unit includes a housing  
32 13 having a platform 14 mounted therein and having a  
33 plurality of flexible engine mounts 15 attached to  
34 the platform 14. An internal combustion engine 16 is

1 mounted to the engine mounts 15 on the platform 14.  
2 The engine is preferably a diesel engine having a  
3 turbocharger with an intercooler. A jet drive unit 17  
4 is mounted beneath the platform 14 of the housing 13  
5 and is attached to the front end 18 of the housing 13.  
6 The jet drive unit extends through the rear 21 of the  
7 housing, out an opening 20 in the housing 13. The jet  
8 drive unit 17 has a water intake 22 and is positioned  
9 to be about level with the bottom 23 of the hull 11.  
10 A water exhaust 24 extending out the rear of the  
11 housing 13. A jet pump 25 is mounted in the jet drive  
12 17 for drawing the water thereinto through the jet  
13 pump and out the water exhaust 24. The jet drive unit  
14 17 is shown below the water line 26 and is supported  
15 on brackets 29 on the front 18 of the housing 13.  
16 Engine 16 has a belt drive 27 having a clutch  
17 mechanism therein for connecting the engine 16 to the  
18 drive pulley 28 of the jet drive unit 17. The housing  
19 13 is sealed against the intrusion of water thereto  
20 and sealed between the platform 14 and the housing 13  
21 to prevent water intrusion and to prevent oil or  
22 engine antifreeze from escaping therefrom.

23 The top of the housing 30 forms a removable entry  
24 portion which is removable from the main part of the  
25 housing 31, as shown in Figure 3. The housing 13 with  
26 the engine 16 and the jet drive unit 17 mounted  
27 therein is attached to the transom 12 of the hull 11  
28 with a pair of brackets 32. Brackets 32 allow the  
29 housing 13 to be mounted even with the bottom of the  
30 boat hull or higher than the bottom of the boat hull  
31 so as to reduce ingress of debris and damage to  
32 wildlife. The hull 11 has the main fuel tank 33  
33 mounted therein having a fuel tank inlet 34 and a fuel  
34 line 35 extending therefrom through the transom 12 and

1 to a quick disconnect 36 where it can be quickly  
2 coupled or decoupled from an internal fuel line 37  
3 located inside the housing 13. The fuel line 37  
4 enters an auxiliary internal fuel tank 38 which has a  
5 fuel line 40 connected thereto which is connected to  
6 a fuel pump 41 for pumping the fuel from the auxiliary  
7 fuel tank 38 and from the main fuel tank 33 and into  
8 the fuel line 42 where it is fed directly into the  
9 fuel injectors of the engine 16. A fuel return line  
10 43 is connected to the auxiliary fuel tank 38 and to  
11 a de-aerator 44 having a bleed top 45 and having a  
12 return fuel line 46 from the engine 16 fuel injectors.  
13 A battery 47 is shown mounted within the housing 13  
14 and is connected through a ground line 48 to the jet  
15 drive unit 17. The engine and drive unit are  
16 controlled through electrical control lines 50 which  
17 is connected through a quick electrical connector 51  
18 which is a waterproof connector mounted through the  
19 housing 13 and to the engine 16 and clutch unit 27 to  
20 control the operation of the outboard jet drive unit.

21 The rear wall 21 of the housing 13 has a tow  
22 bracket 52 attached thereto for attaching a line. The  
23 jet drive unit 17 may also have an anti-cavitation  
24 plate 53 attached to the exhaust portion 54 of the jet  
25 drive unit.

26 As seen in Figure 4, the main fuel tank 33 having  
27 the filler cap 34 is connected through the fuel line  
28 35 to the auxiliary tank 38 having an auxiliary tank  
29 opening 55 and having the fuel pump 41 connected  
30 through the fuel line 40 from the auxiliary tank 38  
31 and through a line 42 to the fuel injectors and back  
32 through a de-aerator 44 from the fuel injectors and  
33 through the fuel line 43 back to the auxiliary fuel  
34

1 tank 38. A breather 45 is connected to the de-aerator  
2 unit 44.

3 In operation, the hull 11 has the fuel tank 33  
4 installed therein along with all the controls and  
5 sensors. The controls and sensors are connected  
6 through the multi-line electrical conductor 50 while  
7 the fuel tank 33 is connected through the fuel line 35  
8 through the transom 12. The outboard drive unit 10  
9 can then be attached to the brackets 32 on the transom  
10 12 in a position to align the bottom of the unit with  
11 the bottom of the hull 23. Then, merely attaching the  
12 quick connect couplings 36 to the fuel line, connects  
13 the fuel lines to the outboard jet drive while  
14 connecting the quick coupling 51 connects the  
15 electrical controls. If the unit has to be removed  
16 for any reason, it can be disconnected from the  
17 brackets 32 by disconnecting the quick couplings 36  
18 and 51 to remove the entire unit. The outboard jet  
19 drive unit 10 is made by constructing a waterproof  
20 housing 13 mounting the jet drive unit 17 therein  
21 underneath the platform 14 and mounting the engine 16  
22 to the engine mounts 15 on the platform 14 and then  
23 connecting the belt drive clutch mechanism 27 between  
24 the engine 16 and the jet drive unit 17 through the  
25 pulley 28.

26 It should be clear at this time that an improved  
27 removable outboard jet drive boat has been provided  
28 which forms a permanent part of the boat while  
29 allowing the quick disconnection and removal of the  
30 entire unit. This provides the advantages of a  
31 conventional inboard jet drive unit with an onboard  
32 fuel tank and control. However, the present invention

33  
34



- 1    should not be considered limited to the forms shown
- 2    which are to be considered illustrative rather than
- 3    restrictive.

CLAIMS:

I claim:

- 1           1. An outboard jet drive boat comprising:  
2           a hull (11) having a transom (12);  
3           a housing (13) sealed against the intrusion of  
4 water and having an engine mounting platform (14)  
5 therein and having an engine (16) mounted in said  
6 housing (13) supported on said platform (14) and said  
7 housing (13) having front and rear sides, and a top  
8 and bottom and having a sealable entrance through the  
9 top thereof, and said housing (13) being removably  
10 attached to the transom (12) of said hull (11);  
11          a jet drive unit (17) being attached in said  
12 housing (13) below said platform (14) and extending  
13 generally parallel to said engine (16), said jet drive  
14 unit (17) extending from the rear of said housing  
15 (13) and being operatively attached to said engine  
16 (16) in said housing (13) above said platform (14);  
17          a main fuel tank (33) positioned inside said hull  
18 (11) and having a fuel line (35) connecting said main  
19 fuel tank (33) to said engine (16) for the feeding of  
20 fuel from said fuel tank (33) to said engine (16),  
21 whereby an outboard jet drive (17) and engine (16) are  
22 removably attached to a boat hull (11) transom (12)  
23 and isolated in a separate housing (13).
- 1           2. An outboard jet drive boat in accordance with  
2 claim 1 in which a secondary fuel tank (38) is mounted  
3 in said housing (13) and coupled between said main  
4 fuel tank (33) and said engine (16).

1           3. An outboard jet drive boat in accordance with  
2 claim 2 in which said housing (13) has a transom (12)  
3 hanging bracket (32) attached thereto and positioned  
4 for attaching said housing (13) to said transom (12)  
5 of said boat hull (11).

1           4. An outboard jet drive boat in accordance with  
2 claim 3 in which said engine (16) is a diesel engine.

1           5. An outboard jet drive boat in accordance with  
2 claim 3 including a fuel pump (41) mounted in said  
3 housing (13) and coupled to said secondary fuel tank  
4 (38).

1           6. An outboard jet drive boat in accordance  
2 with claim 5 in which said engine mounting platform  
3 (14) has engine mounts (15) attached thereto for  
4 supporting said engine (16) thereon.

1           7. An outboard jet drive boat in accordance with  
2 claim 6 having engine controls mounted in said boat  
3 hull (11) coupled to said engine (16) and jet drive  
4 unit (17) for controlling said engine from said hull  
5 (11).

1           8. An outboard jet drive boat in accordance with  
2 claim 7 in which a jet drive unit (17) is mounted  
3 through said housing (13) rear side and attached to  
4 said front and rear sides.

1           9. An outboard jet drive boat in accordance with  
2 claim 8 having a battery mounted in said boat hull  
3 (11) and electrically connected to said engine (16)  
4 for starting said engine (16).

1           10. An outboard jet drive boat in accordance  
2 with claim 9 in which said engine (16) has monitoring  
3 sensors and said boat hull (11) has a plurality of  
4 engine instruments mounted therein operatively coupled  
5 to said engine sensors to provide sensed engine  
6 conditions in said engine instruments in said boat  
7 hull (11).

1           11. An outboard jet drive boat in accordance  
2 with claim 9 having a clutched belt drive (27)  
3 operatively connecting said engine to said jet drive  
4 unit (17).

1           12. An outboard jet drive boat in accordance  
2 with claim 11 in which said housing (13) is sealed  
3 against the intrusion of water and partially extends  
4 into the water when said boat hull (11) is afloat to  
5 provide added buoyancy to said boat hull (11).

1           13. An outboard jet drive boat in accordance  
2 with claim 12 in which said engine (16) has a sealed  
3 engine coolant system whereby the engine cooling is  
4 not dependent upon water from the body of water the  
5 boat hull (11) is floating upon.

1           14. An outboard jet drive boat in accordance  
2 with claim 6 in which said engine (16) is mounted to  
3 said mounting platform (14) generally parallel to said  
4 jet drive unit (17).

1           15. An outboard jet drive boat in accordance  
2 with claim 14 in which said engine (16) is mounted in  
3 a reverse direction to said jet drive unit (17).

1           16. An outboard jet drive boat in accordance  
2 with claim 1 in which said housing (13) is mounted to  
3 said transom (12) above the hull (11) bottom to  
4 thereby reduce the ingress of debris.

1           17. An outboard jet drive boat in accordance  
2 with claim 1 in which said platform (14) is sealed to  
3 said housing (13) to prevent the escape of leaking  
4 liquids from said engine.

1           18. An outboard jet drive boat in accordance  
2 with claim 9 in which said housing (13) has an  
3 auxiliary battery mounted therein.

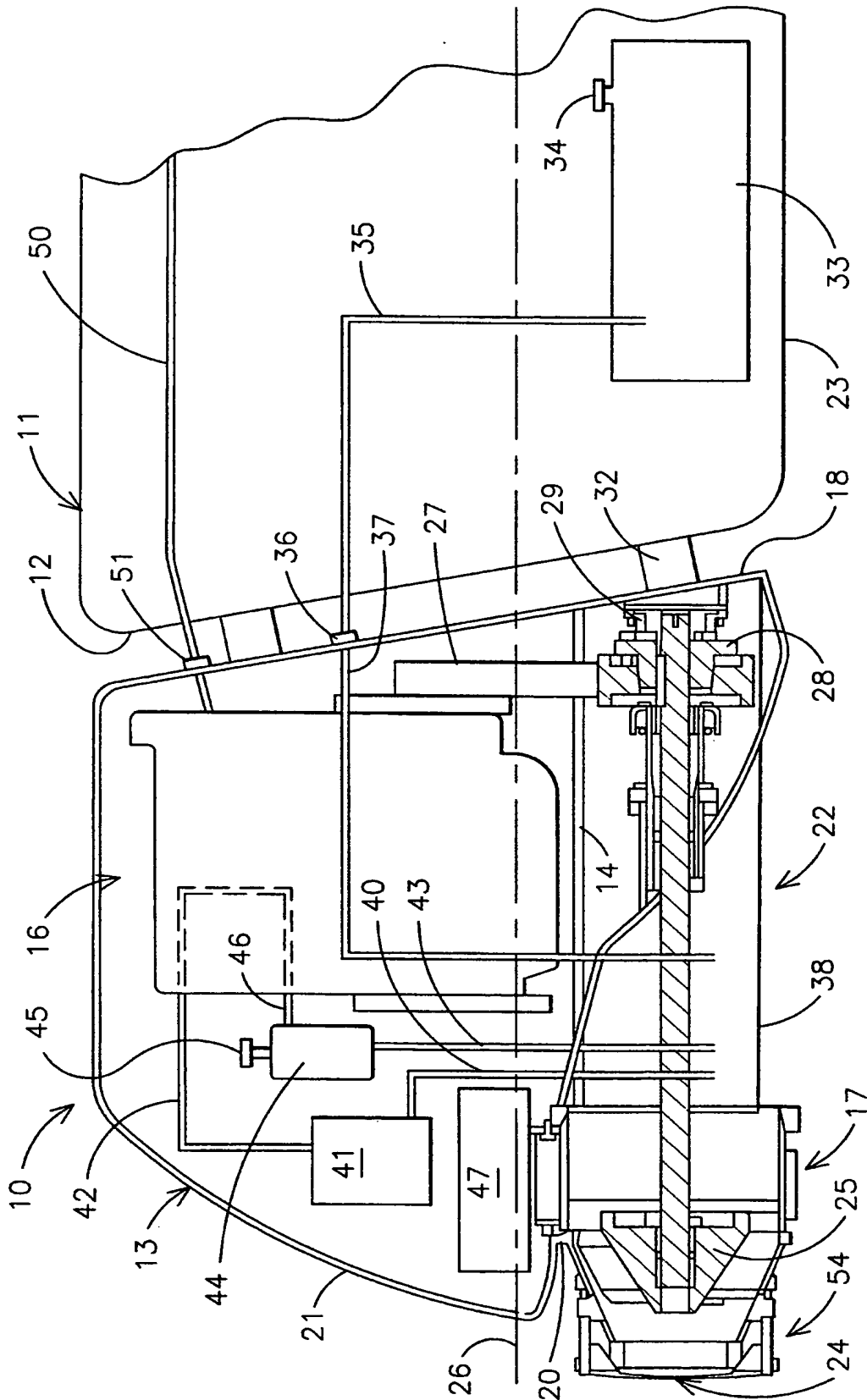


FIG. 1

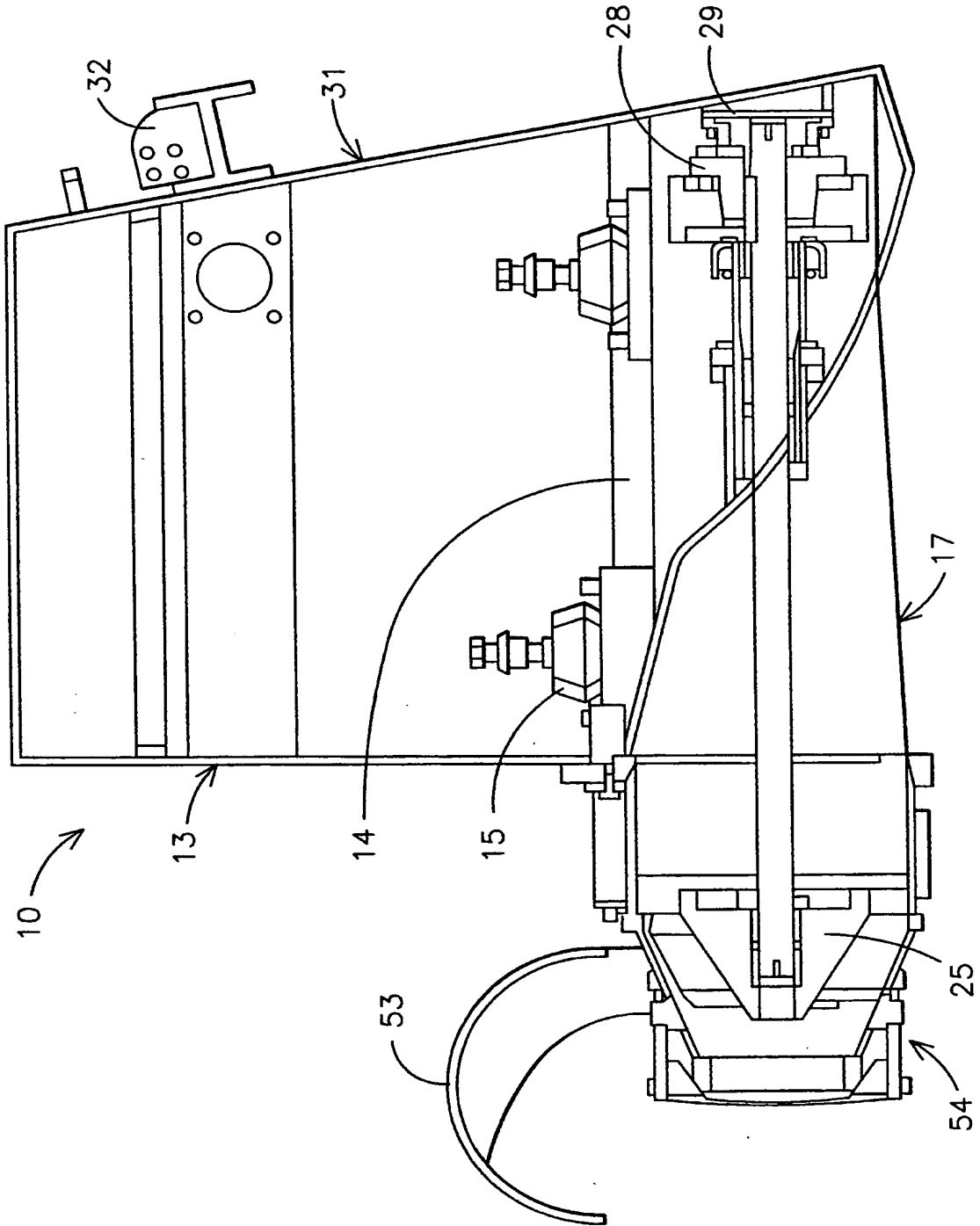
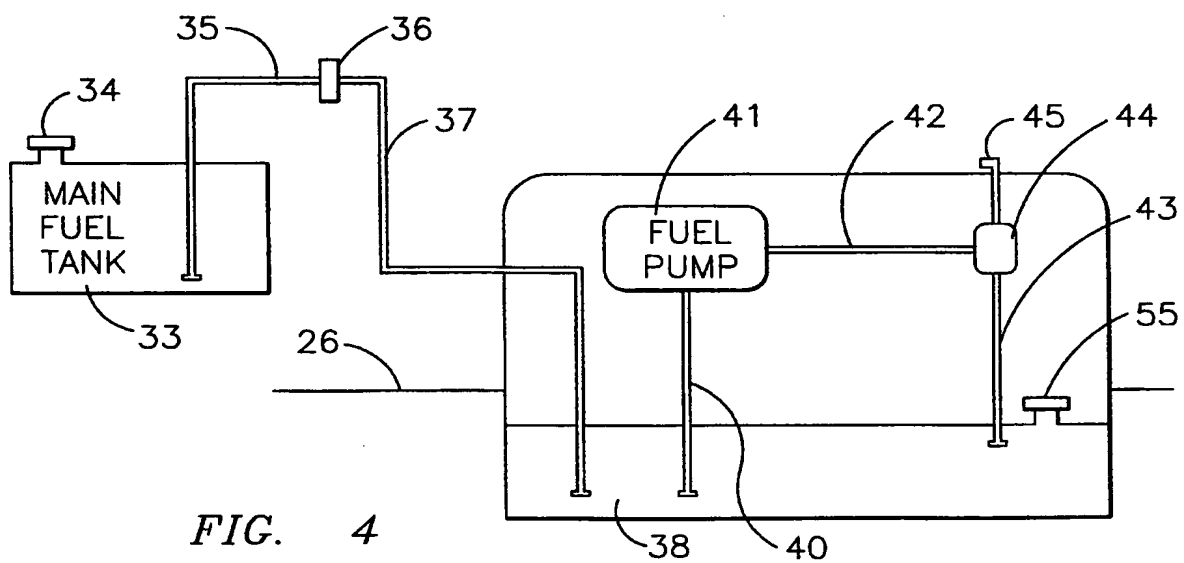
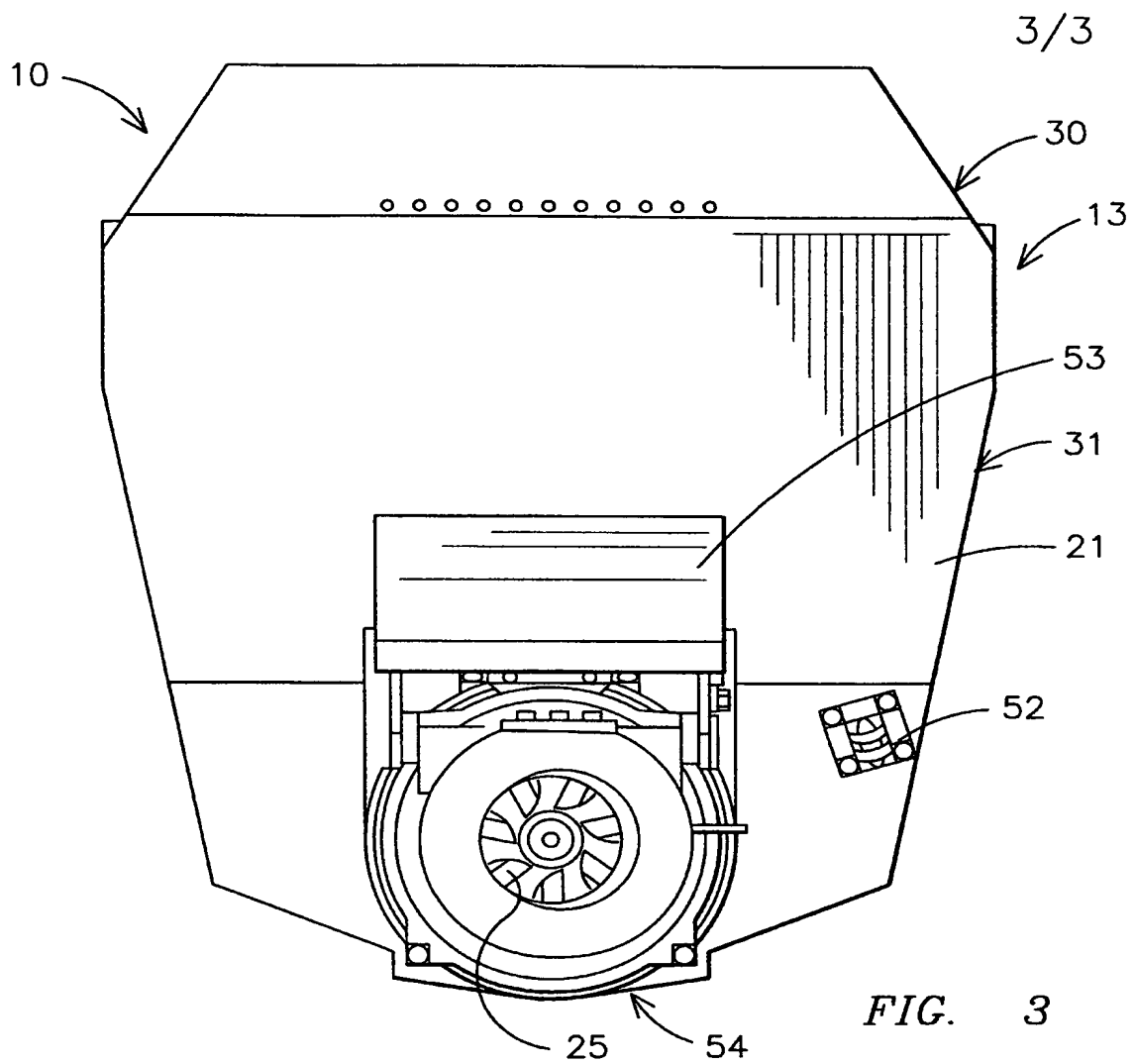


FIG. 2





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Ormond Beach, FL 32174 (US).

(74) Agent: **HOBBY, William, M., III**; Suite 375, 157 E. New  
England Avenue, Winter Park, FL 32789 (US).

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DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR,  
HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,  
LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,  
NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM,  
TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

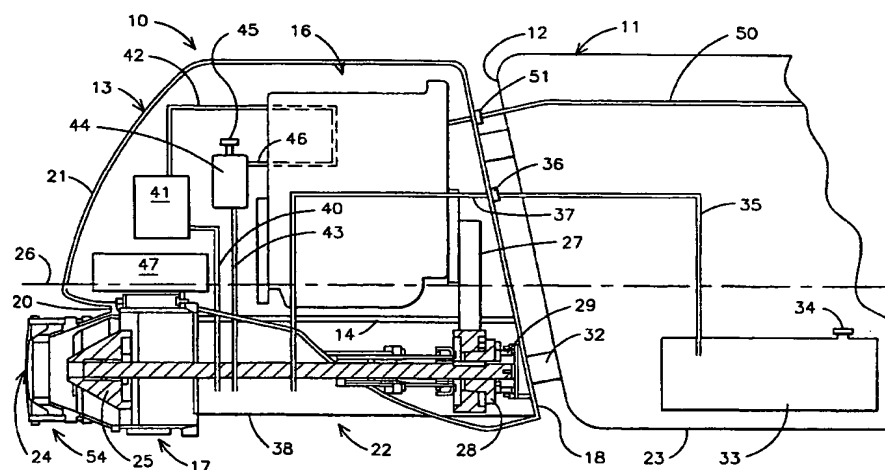
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KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian  
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European  
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,  
IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG,  
CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/40604

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC(7) : B63H/11/00 US CL : 440/38 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) U.S. : Please See Continuation Sheet  Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Please See Continuation Sheet		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y, E	US 6,132,269 A(BELT) 17 October 2000 (17.10.2000), col. 2 and 3.	1, 16, 17
Y	US 4,722,708 A(BALTZ) 02 February 1988 (02.02.1988).	2
Y	US 5,938,490 A (RODLER) 17 August 1999 (17.08.1999), Fig 1.	1, 16, 17
A	US 4,457,724 A(MIYAMOTO) 03 July 1984 (03.07.1984).	None
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents:		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
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Date of the actual completion of the international search	Date of mailing of the international search report	
05 June 2001 (05.06.2001)	02 JUL 2001	
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer Jesús D. Sotelo <i>Diane Smith f</i> Telephone No. 703-308-1113	

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Continuation of B. FIELDS SEARCHED Item 1: 440/38.41.42.900

Continuation of B. FIELDS SEARCHED Item 3: East  
outboard, motor, jet